

direct and steer the distal portion 70 of the device 60 to a destination within the cardiac sinus region, as will be described below.

Like the main body 42 of the stylet 40 shown in FIG. 2, the overall length of the main body 62 and distal portion 70 of the device 60 may be about 80 to 105cm, by way of example and not limitation. Thus, like the stylet of the prior art, the device 60 of the present invention is slightly longer than the typical lead to be implanted with the aid of the device 60. The distal portion 70 may be of various lengths, for example, about 5-15cm.

Although variations will suggest themselves to skilled artisans, the basic relationship between the overall length of the main body 62 and the distal portion 70 of the device 60 and the overall length of the lead 10 (from the connector assembly to the tip aperture) is such that with the main body substantially fully advanced into the lead, the flexible distal portion 70 projects distally from the aperture in the lead tip.

FIG. 5 shows a device 90 in accordance with a second embodiment of the present invention. The device 90 of the second embodiment is identical to the first embodiment shown in FIG. 4 to the extent that it includes, like the device 60, a main wire body 92 having proximal and distal extremities 94 and 96, respectively, a steering knob 98 secured to the proximal extremity 94 of the main wire body 92, and a distal portion 100. Like the first embodiment, the distal portion 100 of the device 90 comprises a wire coil 102 having a proximal end 104 affixed to the distal extremity 96 of the main wire body 92. In the case of the second embodiment, however, the outer diameter of the wire coil 102 is less than that of the main wire body 92 in order to provide the wire coil 102 with even greater flexibility. The wire coil 102 is again preferably made of a biocompatible, biostable alloy such as stainless steel and it is secured to the distal extremity 96 of the main wire body 92 by means of a weld 106 or similar bond. The main wire body 92 includes a taper 108 at the distal end joining the larger diameter main wire body with the smaller diameter distal extremity 96. Again, the wire coil 102 includes a distal tip 110 that

may be melted or fused to form a smooth leading surface. The overall length of the main wire body 92 and distal portion 100 as well as the materials may be as described in connection with the first embodiment.

FIG. 6 shows the distal part of a device 120 in accordance with a third embodiment of the present invention. The device 120 includes a main body 122 having a distal extremity 124 and a steering knob (not shown) secured to a proximal extremity, along the lines of that already described in connection with the previous embodiments. The device 120 includes a flexible or floppy distal portion 126 comprising a proximal section 128 formed of a wire coil 130 having an outer diameter substantially the same as that of the main wire body 122 and a distal section 132 comprising a very soft wire coil 134 having a diameter smaller than that of the proximal section 128. The wire coils 130 and 134 comprising the proximal and distal sections of the distal portion 126 of the device may be formed of a continuous wire wound about a stepped mandrel to define the two sections of the distal portion 126. Alternatively, the wire coil sections 130 and 134 may be separately formed and joined, by brazing or welding, at an interface 136 between the sections. By way of example and not limitation, the wire of the wire coil section 130 may have a gauge and coil pitch as described above in connection with the embodiment of FIG. 4. Further, by way of example and not limitation, the small wire coil 134 may be formed of No. 45 to 38 Brown and Sharpe gauge wire (.00176 to .00396 inch diameter, respectively) with a pitch of about 560 to about 250 turns per inch, respectively. As before, the distal portion 126 has a proximal end 138 affixed to the distal extremity 124 by means of a weld 140 or the like. The proximal section 128 of the distal portion 126 of the device 120 is very flexible; the distal section 132, given its smaller diameter, is even more flexible and softer and this construction facilitates the feeding of the distal portion 126 of the device through the tortuous vessels in the coronary sinus region of the heart without damage to the vessel walls. The smaller diameter wire coil 134 forming the distal

section has a distal tip 142 that may be melted or fused to form a smooth surface.

FIG. 7 shows the distal part of a device 150 in accordance with a fourth embodiment of the invention. The device 150 includes a main wire body 152 and a distal portion 154 comprising a proximal wire coil section 156 and a distal wire coil section 158, similar to that shown in FIG. 6. The diameter of the proximal wire coil section 156 in FIG. 7 is smaller than the outer diameter of the main wire body 152 and the distal wire coil section 158 has a diameter that is smaller than that of the proximal wire coil section 156. As in the case of the second embodiment shown in FIG. 5, the object is to provide the distal portion 154 of the device 150 with even greater flexibility and softness than that obtainable from the embodiment of FIG. 6.

FIGS. 8-10 show the distal part of a device 180 in accordance with a fifth embodiment of the invention. The device 180 includes a main wire body 182 and a flexible distal portion 184 that, in accordance with a preferred form of the fifth embodiment, comprises an extension of the main wire body 182. The distal portion 184 comprises a proximal section 186, having an outer cylindrical surface 188 concentric with that of the main wire body 182 and joined thereto by means of a tapered transition 190. The distal portion 184 further includes a distal section 192 comprising a distally projecting, thin, very flexible ribbon or flat leaf 194 that is easily twisted and is particularly pliant or bendable along an axis 196 perpendicular to the broad surfaces of the leaf 194. The leaf 194 has a distal tip 198 and, in accordance with the specific embodiment under consideration, the leaf preferably has a width equal to the diameter of the proximal section 186 of the distal portion and is joined thereto by means of a tapered transition 200. Although the distal portion 184 of the device and the main wire body 182 may be a one piece or unitary structure, it will be evident that the main body 182 and the proximal and distal sections 186 and 192 may be constructed of separate pieces welded or otherwise bonded together. The proximal section 186, given its smaller diameter, is